Headquarters U.S. Air Force

Integrity - Service - Excellence

FOOD VULNERABILITY ASSESSMENTS

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FOOD SAFETY AND SECURITY

Vision: Public Health Protection through Safe Food and water sources

Strategy: Stop attacks and also reduce vulnerability to them before they occur

- **We will accomplish this through:**
  - **Identifying our food assets**
  - **Identify potential threats**
  - **Use Operational Risk Management (ORM) for food safety and security**

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National Food and Agriculture Assets

- ✓ U.S. agriculture has a $1 trillion value and provides 22 percent of all jobs. Production exceeds $200 billion with over $55 billion in exports.

- ✓ Production: Over 500,000 farms
- ✓ Processing: 57,000 food; 6,000 meat, poultry,egg

- ✓ Distribution
- ✓ Transportation

- ✓ Retail: Over 1.2 million

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Identify Potential Threats

- **The DOD January 2001 Proliferation: Threat and Response report for the first time identified that attacks against the U.S. food supply could affect the economic stability of the country and erode military readiness.**

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Terrorist Profiles

- New recruits: 17-24 YOA, Male, educated, not socially integrated, stable backgrounds, unhappy
- Bombers: 25-35 YOA, Male, more patient now
- Leadership: 35-45 YOA, least reckless

- Animal Rights activists: Female or male, young to middle aged, college educated and often affluent
  - More prone to vandalism than violence
- Anti-technology activists: Disaffected but may be educated

Intelligence

- Terrorist groups may actually publicize their activities
  - Fund raising and recruitment
- Web sites may reveal increased levels of activity in locations or at certain times
  - Law enforcement cannot possibly track all activities
- Important or symbolic dates may be used
  - www.terrorism.com
- Most terrorist ops occur within 90-150 miles from their base

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Average Timelines and Preventive Measures

- Create group/recruit members
- Raise funds
  - One year
- Select weapon and then target
  - 4 months
- Select date and do recon
  - Weeks
- Identify recruitment
- Vulnerability assessment
- Remove financial support
- Monitor weapon substances
- Countersurveillance

- Data courtesy of L.E.A.R.N., Inc.

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Average Timelines and Preventive Measures

- Move weapon to target, leave site, activate weapon (minutes)
  - < one hour
- Media attention
- Claim responsibility
- Reduce public support of gov't
  - Indefinite time
- Data courtesy of L.E.A.R.N., Inc.

- Increase security on important dates
- Harden target, increase awareness, response activities (if detect)
- Increase media awareness of publicity goals
- Law enforcement investigation
- Gov't maintain strong support

Examples of Food Contamination

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- Salad bars contaminated with *Salmonella*--751 ill and over 125
  hospitalized in Dalles, Oregon ("small potatoes!!")

- Milk contaminated with *Salmonella*--estimated over 200,000
  illnesses in Chicago
- Ice cream and *Salmonella*--estimated 250,000 illnesses
  nationwide

- Powdered milk contaminated with arsenic--over 130 deaths
  in Japan
- Arsenic painted on bread of Nazi prisoners by Jewish non-state
  assassins--estimated >200 dead

- Apple juice and *E. coli* 0157:H7--over 70 sick and one

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Modes of CB Terrorism
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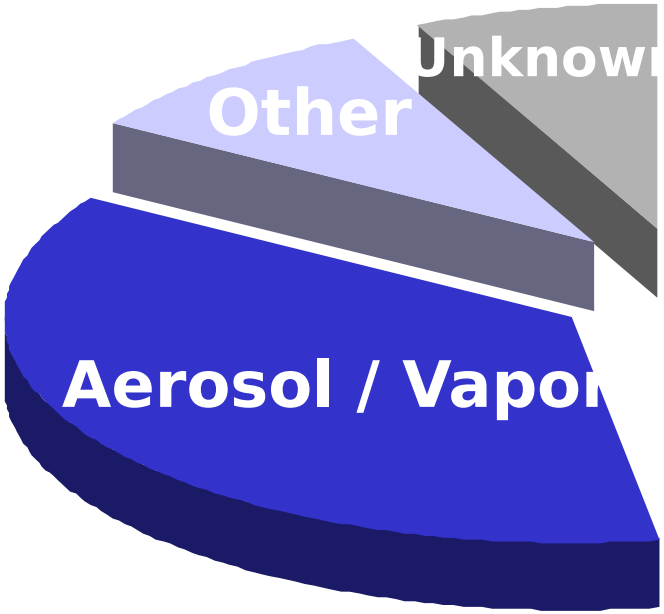
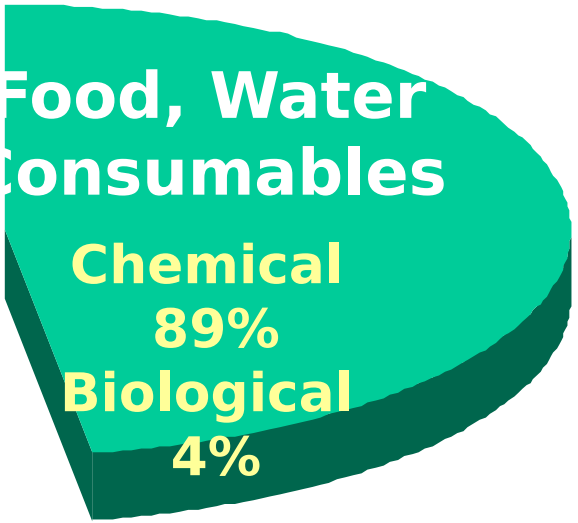
Analysis of 233 past incidents of CB terrorism concludes …. top four means of delivery:





Harvey J. McGeorge, ***Weaponization and Delivery of Chemical and Biological Agents: A Terrorism Perspective***. Proceedings, Chemical and Biological Medical Treatment Symposia, Dubrovnik, Croatia, April, 2001

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BW Foodborne Illness Agents

- **DoD top 10 risk agents**
  - Anthrax
  - Botulinum toxin
  - Plague
  - Ricin
  - Smallpox
  - Encephalitis viruses
  - Ebola/marburg
  - Tularemia
  - Staph. Enterotoxins
  - Glanders
- **Foodborne illness agents**
  - Anthrax
  - Botulinum toxin
  - Plague
  - Ricin
  - Tularemia
  - Staph. Enterotoxins

BW Agent Risk Assessment; DoD Matrix For Agents In Food

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Medical Risk (GREATEST → LEAST)

Catastrophic	None	None	None	None
Critical	Anthrax Bot.Toxin Plague Ricin	None	None	None
Marginal	None	Tularemia Staph. Enterotoxin	none	Mycotoxins (Tricothecene)
Negligible	None	None	Q-Fever Cholera	Brucellosis

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Chemical Warfare Agent Effects on Food

- **CW Agents**

1. Nerve agents (liquid, vapor)
2. Blister agents (liquid, vapor)
   - Mustard
   - Lewisite
3. Choking agents
   - Phosgene
   - Chlorine
4. Blood agents
   - Cyanide type agents
5. Riot control agents
   - Tear agents

- ✓ Condemn foods exposed To nerve and blister agents
- ✓ Choking agents and riot control agents--wash food Expose to air 24 hr, can cause food to be unpalatable
- ✓ Cyanide unlikely to produce dangerous contamination aerosolized

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Chemical Agents Food Contamination

	Agent			
	Arsenic	**Cyanide**	**Pesticides**	**PCB/Dioxin**
Lethal Dose	**Less than 1/4 gram for trioxide**	**Less than 1/4 gram for Na**	**100 to 200 ml to .05 ml for DDT**	**ppm/ppt Significant risk (lethal at ug/kg)**
Time between Exposure and symptoms	**10 minutes to several days Vomit, diarrhea, collapse, shock**	**Few minutes to several hours Anxiety, convulsions, cardiac and resp**	**30 minutes to several hours Neurotoxins convulsions GI cramps, miosis**	**Days to years Immunotoxicity Neurologic Birth Defects Cancer**
Inactivation time and temp	**None by cooking**	**None by cooking**	**None by cooking**	**None by cooking**
Treatment	**None symptomatic (BAL not helpful)**	**Amyl nitrite, Na nitrite, and Na thiosulfate**	**Atropine 2-PAM Diazepam**	

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CB Food Terrorism

- **Historically, consumables are a lower technology approach**
  - **Lower cost, less risk to perpetrators**
  - **Ready access to biologic agents or toxic chemicals**
  - **Ease of dissemination**
  - **More select targeting, having both direct and indirect economic impact**

Cigar Case with Cyanide sour

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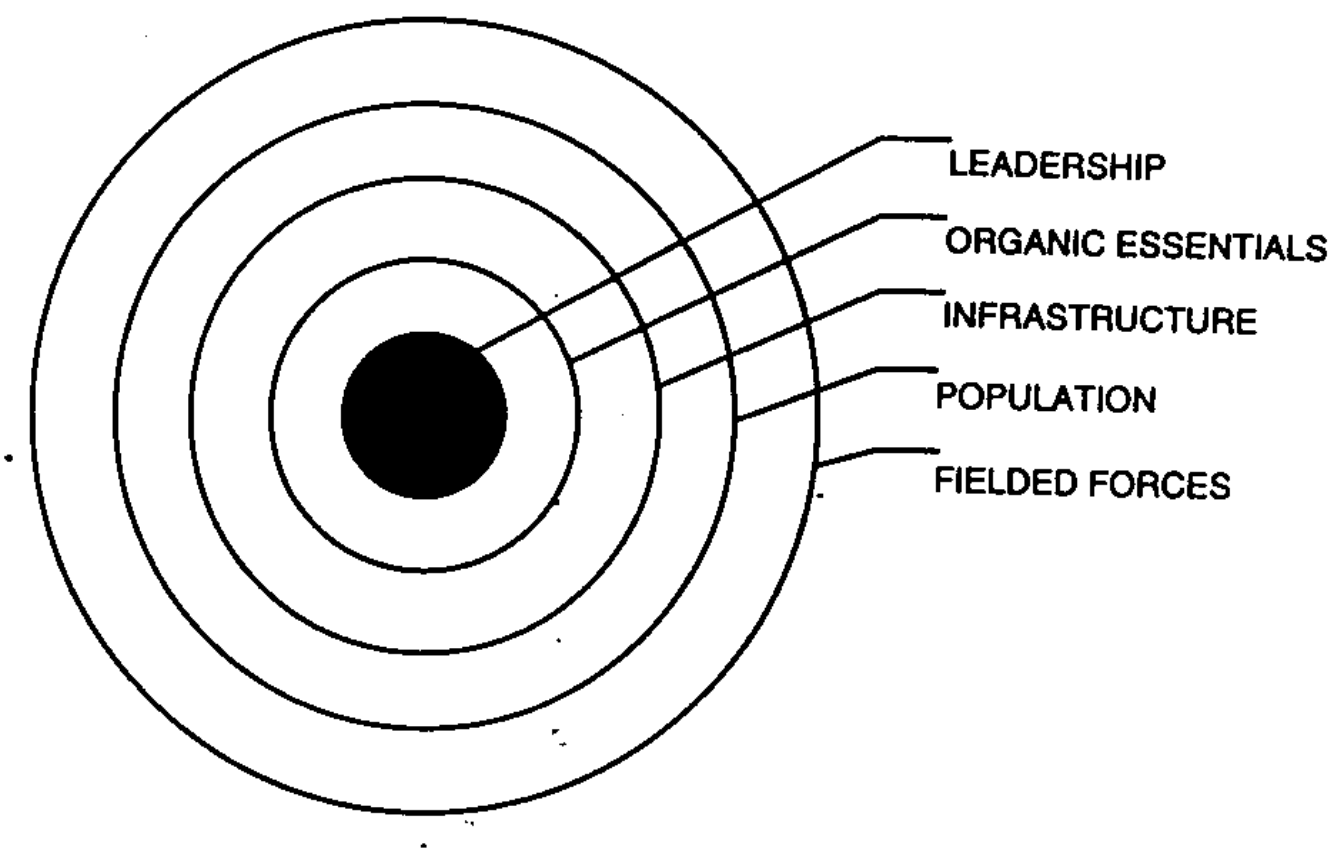
Centers of Gravity



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Identify Potential Threats

- ✓ **Aggressor: Criminals, terrorists, protesters, subversive, disgruntled insiders**
- ✓ **Type of agents: Chemical, Biological, Radiological and Physical**
- ✓ **Tactics: Exterior attacks, Forced entry, covert entry, insider compromise**

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INTRODUCTION TO ORM

What is ORM? It is a 6-step sequence to increase operational effectiveness by anticipating hazards and reducing the potential for loss.

Purpose of ORM The purpose of ORM is to minimize risks to acceptable levels, proportional to mission accomplishment

Benefits of ORM Provides more effective use of resources reduce mishaps and can be used to improve food safety and security.

Origin of ORM The concept grew out of idea developed to improve safety and reduced losses in aircraft, space vehicles and nuclear power.

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FOOD SAFETY AND SECURITY RISK COMPARISON

TRADITIONAL	ORM
Random, individual Dependent	Systematic
Common Sense	Methodical
Uninformed Decision	Decision based on risk vs. benefit
Compliance Based	Involvement & Empowerment
Reactive	Proactive

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ORM Rules

1. Accept no unnecessary risk

2. Make risk decisions at the appropriate level

3. Accept risk when benefits outweigh the costs

4. Integrate ORM into policies and planning at all levels

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FOOD SAFETY AND SECURITY ORM

1. Identify the Hazards
2. Assess the Risk
3. Analyze Risk Control Measures
4. Make Control Decisions
5. Implement Risk Controls
6. Supervise and Review

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FOOD PRODUCTION FLOW DIAGRAM

FARM

Transport/Storage

Food Processor/
Feed lot/Feed mill

Transport/Storage

Retail

Government and Industry must work together at all steps especially Processor

Food can be contaminated with microbes, toxins, chemicals, heavy metals

FOOD SAFETY AND SECURITY

Purpose: Step 1 - Identify where Hazards can be introduced.

Step 2 - Identify where Hazards can be introduced.

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Method: **Conduct on site review of each activity or event in food production process. Assess hazards at each step or activity**

--Hazards can be due to people, environment, and machines

--Use the "What If" Tool to capture input of operating personnel

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FOOD SAFETY AND SECURITY
Step 1. IDENTIFY THE HAZARD

Activity/Event	Hazard
Fresh vegetables grown on farm	Many employees with multiple tasks and no ID badges (1)
Transported in refrigerated truck	Trucks are not secure; no security in hiring drivers (2)
Food Processor/ transport	Water used to clean product is not potable (3)
Stored in restaurant	No locks, exterior door unsecured 4
Food preparation	New employees no background check on

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ASSESS THE HAZARDS

SEVERITY

- ***CATASTROPHIC*—Complete mission failure, death.**
- ***CRITICAL*—Major mission degradation, severe injury and illness.**
- ***MODERATE*—Minor mission degradation, minor injury or illness.**
- ***NEGLIGIBLE*—Less than minor mission degradation, less than minor injury or illness**

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ASSESS THE HAZARDS

PROBABILITY

- ***Frequent***-Occurs often in career to individual a population is continuously exposed
- ***Likely***-Occurs several times in a career and population are exposed regularly
- ***Occasional***-Will occur in a career and occurs sporadically in a population
- ***Seldom***-May occur in a career and occurs seldo in a population
- ***Unlikely***- So unlikely you can assume it will not occur in a career and occurs very rarely in a population

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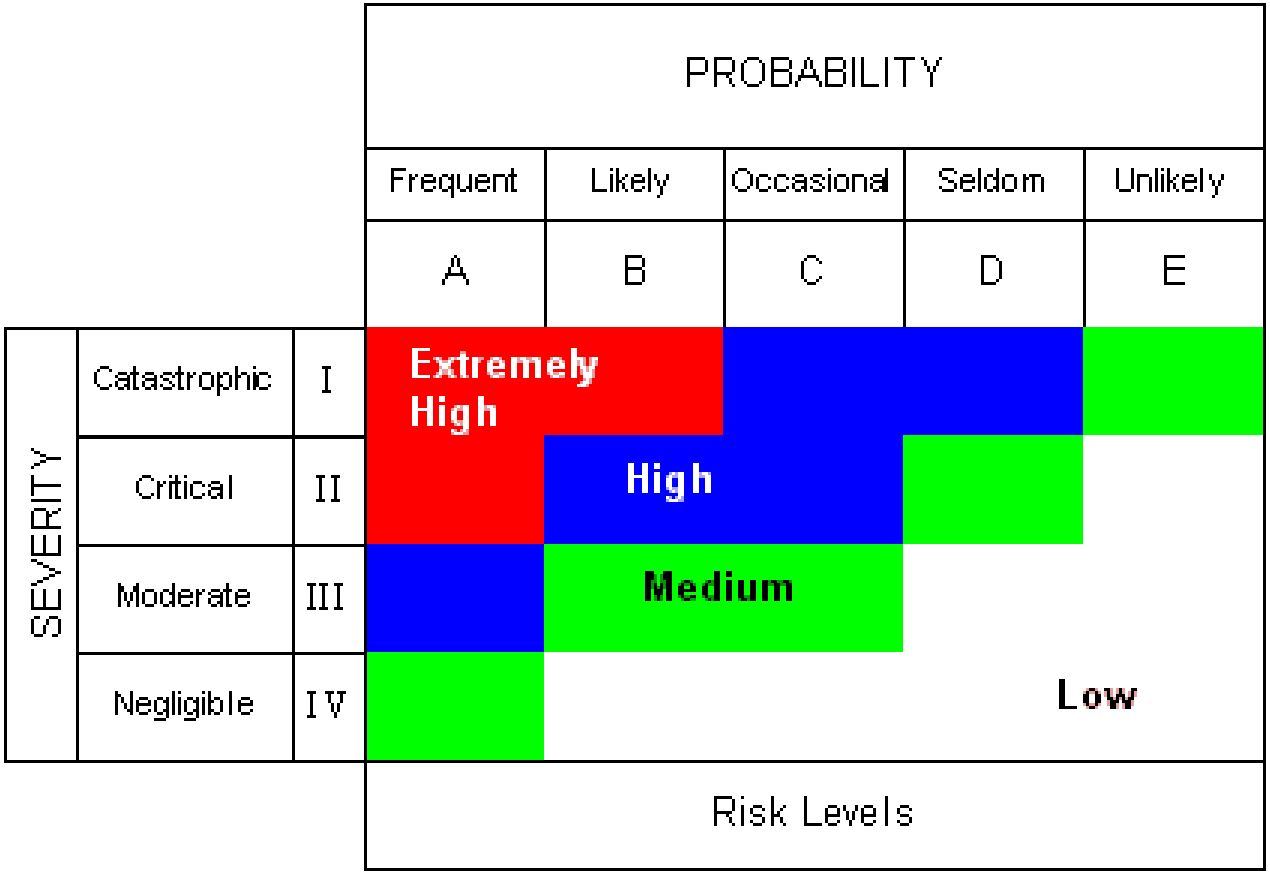
Operational Risk Assessment Matrix

STEP 2: ASSESS THE RISK



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Operational Risk Assessment Matrix

STEP 2: ASSESS THE RISK

			PROBABILITY				
			Frequent	Likely	Occasional	Seldom	Unlikely
			A	B	C	D	E
SEVERITY	Catastrophic	I	1	2	6	8	12
	Critical	II	3	4	7	11	15
	Moderate	III	5	9	10	14	16
	Negligible	IV	13	17	18	19	20
			Risk Levels				

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Step 2. Assess the Risk

Hazard Identified	Assess the Risk	Risk Level
Trucks are not secure; no security in hiring drivers	New employees hired Could be aggressors. Could contaminate product harm people, machines, facility	
New employees no background check, on midnight shift, given locker required to have own lock	New employees hired Could be aggressors. Could contaminate Product, harm people, Machines, facility	

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Step 2. Assess the Risk

Hazard Identified	Assess the Risk	Risk Level
Trucks are not secure; no security in hiring drivers 2	New employees hired Could be aggressors. Could contaminate product harm people, machines, facility	Critical seldom Medium 11
New employees no background check, on midnight shift, given locker required to have	New employees hired Could be aggressors. Could contaminate Product harm	Critical seldom Medium 11

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Step 2. Assess the Risk

Hazard Identified	Assess the Risk	Risk Level
Water used to clean product is not potable 3	Could result in Contaminated product	
No locks, exterior door from kitchen is unsecured (4)	Aggressors could enter from exterior door contaminate product, harm people, Machines, facility	

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Step 2. Assess the Risk

Hazard Identified	Assess the Risk	Risk Level
Water used to clean product is not potable	Could result in Contaminated product	Critical Likely High 4
No locks, exterior door from kitchen is unsecured	Aggressors could enter from exterior door contaminate product, harm people, Machines, facility	Critical Likely High 4

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Step 3. Analyze Risk Control Measures

- ✓Reject: Refuse the risk
- ✓Avoid: Cancel job
- ✓Delay: delay a risk
- ✓Transfer: spread loss to another
- ✓Spread: increase time between exposures
- ✓Compensate: redundant capabilities
- ✓Reduce: Plan systems without hazards
  - ✓Incorporate safety devices
  - ✓Provide warning devices
  - ✓Develop procedures and training

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Step 3. Analyze Risk Control Measures

Hazard	Risk Control	Rank
Aggressors could enter from exterior door contaminate product, harm people, Machines, facility	-Post the door with signs that identify not an exit -Put up security cameras -Put guard on door -provide warning device and Install a panic bar	2 3 4 1
New employees hired Could be aggressors. Could contaminate Product, harm people, Machines, facility	Reject the risk. -Put new hires on day shift for first 90 days Do periodic background checks and provide locks	1

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Step 4. Make Risk Control Decisions

Hazard	Risk Control	Rank
Aggressors could enter from exterior door contaminate product, harm people, Machines, facility	-provide warning device and Install a panic bar -Post the door with signs that identify not an exit -Put up security cameras -Put guard on door	1 2 3 4
New employees hired Could be aggressors. Could contaminate Product, harm people,	Reject the risk. -Put new hires on day shift for first 90 days Do periodic background checks and provide locks	1

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Step 5. And 6.

Step 5. Implement Risk Control Decision

- Make assets available to implement specific co
- Inform personnel in the system
- Provide management support
  Award programs etc

Step 6. Supervise and Review

- Monitor effectiveness of control actions
- Provide feedback system (audits etc)

FOOD SAFETY AND SECURITY ORM

1. Identify the Hazards
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Questions?